SECRET

IEG-94/70
27 March 1970

MEMORANDUM FOR: Chief, Research and Engineering Division/Technical
Services and Support Group

SUBJECT : Adage Proposal WA 003-1, 2 March 1970

1. As I mentioned at the conclusion of yesterdays briefing for
on subject proposal, I still have three hangups:

25X1

a. The interface between the Adage Graphics Terminal
and the 494 system should be on-line rather than off-line
utilizing transfer of specifically prepared magnetic tapes.
Adage will develop an information retrieval capability
within their terminal to extract their required data from
these tapes.

I believe the money for this retrieval capability would
be far more effectively spent in hardwiring the graphics
terminal to the 494 system, a task which the Adage proposal
defers to the future. Much faster and more sophisticated
retrieval capability already exists on the 494. Besides,
why not do the retrieval job one time e.g. at the time when
the mag tapes would be produced?

b. The proposal provides for purchase of an electrostatic
printer-plotter. This printer may be useful for producing
poor quality copies at the graphics terminal site. However,
we have equipment capable of producing far better quality
already in-house, i.e. Cal Comp, Concord and B&L plotters.
A Cal Comp is available and could be used at the side either
directly connected to the terminal or through the 494.
Printers include the Kleinschmidt printers, teletypes and
DCT 2000. Again I believe funds earmarked for the electrostatic
printer could be used to better advantage if allocated to the
development of the direct 494-Adage interface.

Some additional finds for developing an on-line interface
might be derived from other redundant capabilities. The 494
system already has a high speed capability to produce five
channel communications tape which could be utilized if the

what Money

It. Does?

?

*None of In house
Plotters designed
for Text - Probably
No programs for Text
- Programming costs
may exceed plotter
costs. If speed of
Teletype to slow
for tape - also too
slow for printing*

*494 punch off
line - probably can
put high speed
punch on Adage
cheaper than*

SECRET

SUBJECT: Adage Proposal for Graphics Terminal

494 Prepairs Mag Tape - Transfered to 1004 off-line Commo Paper Tape Prepaired at 110 cps

terminal were on-line with the 494. The need to produce
punched paper tape for input to the Photon 713 directly
from the terminal is subject to serious question. The
whole problem of automating third-phase report composition
is currently under study by the Computer Sciences Corp.
The proposed teletype punch unit is, I believe, far too
slow for the volume of output anticipated; both high speed
paper tape punch and other teletype punches could be
accessed directly if the Adage terminal were on-line.

ASR Teletype 100 cpm

    c. Finally, I believe the five day consultation time
with Dr. Englebart is barely enough to scratch the surface
of defining an efficient editing program tailored to NPIC's
peculiar reporting requirements and constraints. Some of
the knotty points which need to be considered are:

       1. Production of indexes, production of tables
of contents and composition of publications.

       2. Standard report formats should be callable;
entries should be automatically edited.

       3. Consistency within a report in numbering
figures and bibliographic references. Composition
of outlines, tables, lists of illustrations, and
bibliographic references. Correlation of graphics
with related textual information.

       4. Automatic performance of recurring operations
such as generation of standard report distribution
lists. This means if a user, PI or editor, finds a
recurring operation, he should be able to program it
fairly simply.

       5. Safeguards so that manuscripts being edited
cannot be obliterated accidentally without recourse.

  2. As stated before, IEG believes that on-line editing may have
great potential for application to IEG's reporting functions. The graphics
capability may also have considerable potential for application. IEG
continues to believe, however, that considerable needs analysis, systems

SECRET

SUBJECT: Adage Proposal for Graphics Terminal

design, and system engineering must be completed before purchasing
equipment. The proposed purchase of equipment will only provide an
intriguing play-thing for use by those who have the time to procure
specially prepared input tapes, learn the details of operation of the
system and have the ability to program the system. I wish IEG could
afford this kind of time for it would be fun. Enough is known about
automated editing to design a very useful system a priori without
extensive, frustrating and damaging trial and error.

_Software
the key
rather than
equipment
configuration

Computer
Application
Rather
Than
Hardware
System_

25X1

                                    Chief, Imagery Exploitation Group
                                              NPIC

Distribution:
   Orig & 1 - NPIC/TSSG/RED
           1 - NPIC/PFBS
           1 - NPIC/PSG
           1 - NPIC/PEG/AID
           2 - NPIC/IEG
           1 - NPIC/IEG/OD

SECRET

DRAFT

23 March 1970
(Revised 10 April)

PROGRAMMING CONSIDERATIONS FOR THE ADAGE GRAPHICS TERMINAL

1. The Imagery Exploitation Group has declared its interest in
the following files for use with the Adage Graphics Terminal (AGT) in
preparation of first, second, and third phase reports:

    a. The Exploitation Products Data File

    b. The Installation Data File

    c. The Target Brief File

    d. The Mensuration Parameters File

2. The Exploitation Products Data File (EPDF) itself consists of
24 different types of written reports received from various components
of the US Army, the US Navy, the US Air Force, the CIA, the DIA, NATO,
[   ] sources. The index for the EPDF is a magnetic tape based file   25X1
consisting of 85 character records blocked 30 records to a block and using
the standard block descriptors and tape labels provided by NPIC's File
Control System (FCS). This file is produced on the Uniservo VIII C mag-
netic tape unit. This unit uses the so-called NRZI (non-return to zero,
change on one) recording method. The information is read or written by
passing the oxide side of the tape over the read/write head. Every
magnetic flux reversal is sensed as a binary one and the absence of a
flux reversal as a zero. The space occupied by a character on tape is
called a frame, and each character consists of six data bits and one parity
bit. Each frame is recorded across the width of the tape giving it seven
tracks running the length of the tape. Data is stored on the tape in the
form of the aforementioned blocks whose lengths are determined by the
number of records and the number of characters/record programmed for

SECRET

storage on the tape. The validity of the data is checked by using a longitudinal redundancy check and a vertical redundancy check. The longitudinal redundancy check monitors all tracks to ensure that there are an even number of one bits in each track of every block. A longitudinal check frame is written in the fourth frame position following the last frame in each block. The choice of the bits in the check frame is such that the even-number-of-one-bits criterion is met. The gap between the longitudinal check frame of one block and the first frame of the next block is called the interblock gap. The interblock gap used for the VIII C seven track recording is 0.75 inch. The vertical redundancy check or parity check is performed on each frame, that is, on each column of bits across the width of the tape. Even parity is generated for binary coded decimal (BCD) when data is written onto the tape. The index for the EPDF is in BCD. Recording density, measured in frames/inch or bits/inch is 556 for this file. The NRZI recording method, the longitudinal redundancy check, the vertical redundancy check, and the interblock gap mentioned here make this file IBM compatible; i.e., it may be used on an IBM 7-track tape drive. Many manufacturers claim IBM compatibility of their products, but it always is wise for the user to investigate the extent to which the claims are met.

3. The Installation Data File format was unavailable at this time. When the Integrated Information System is operational, this file will be maintained on the FASTRAN Mass Storage Subsystem. However, it will be backed up with magnetic tapes produced on the Uniservo VIII C tape units.

4. The Target Brief File, sometimes called the BLIP file, consists of a Target Brief Master file (TBM) and a Target Index Master file (TIM). The TIM differs from the TBM in that it contains only header records.

The TBM contains headers and detail records as well. Both TBM and TIM are magnetic tape based files consisting of 220 character records blocked 20 records to a block, and again use block descriptors and tape labels provided by the FCS. Recording modes and densities for the TBM and TIM are the same as the index for the EPDF. The current TBM is divided by World Aeronautical Chart number (WAC) into eighteen reels of magnetic tape. No one WAC segment will exceed one reel of magnetic tape.

5. The computer program 4PC4T has an option which provides a Mensuration Parameter File (MPF) on magnetic tape for its particular camera system. Similarly, another program, 4PC8T, provides on a magnetic tape a MPF for its camera system. These MPF's have 120 characters per record and are blocked 1 record per block. Every indication is that the FCS is not used by 4PC4T and 4PC8T and, as a result, the tapes produced by them are unlabeled and have no block descriptors. The recording modes and densities are the same for these MPF's as the other files.

6. The Adage proposal calls for their M̶P̶8̶ ^{TP} Digital Magnetic Tape Unit to be used as the interfacing device with the UNIVAC 494. The MTP8 is made by the Potter Instrument Company of Plainview, New York for Adage. It reads and writes IBM compatable 7-track tapes at 556 BPI. As a result of previously stated facts concerning the files desired by IEG, this method of interfacing is most certainly feasible. Many man-months of effort, from both NPIC and Adage, would be required to write and debug the UNIVAC 494 handler and associated AGT program which would permit the Adage terminal to operate on-line. The amount of effort would vary with the type of interface for the terminal. (The interface can be made at

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either a channel or a Communications Terminal Module.) There is a great

likelihood that the efforts to develop the editing and graphics capabilities

of the terminal would become stalled behind the interfacing effort. (NSA

has experienced delays in the operational use of one of their AGT 30's

as a result of the slow implementation of the software interface between

it and a CDC 6600. They must use magnetic tapes for their files as an

interim measure.) The magnetic tape route is probably the more desirable

from the standpoint of research and development of the AGT as a tool for

IEG.

7. Figure 1 shows a file organization for special display requests

as would be used by the AGT. Input data directly updates a data base which

is not organized according to display categories. Special display requests

are composed by the user by specifying a set of descriptors to define the

data he wants displayed. This method permits him to specify the format

in which he wants data presented. The data retrival process extracts

data from the data base which satisfies the criteria.

display requests

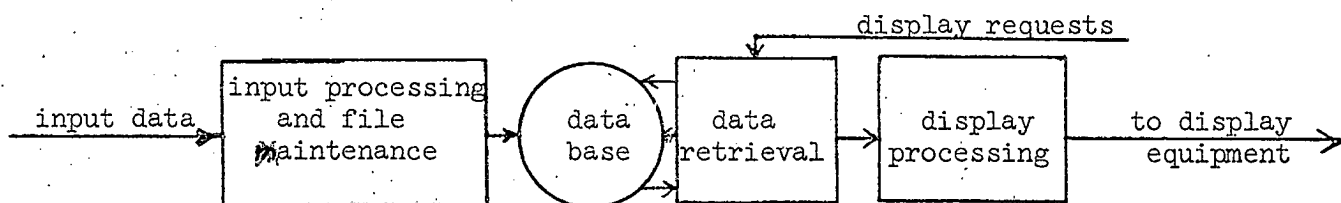| input data → | input processing and file maintenance | → | data base | data retrieval | → | display processing | to display equipment → |

Figure 1 - File organization and display request method

8. The Adage disk memory subsystem, DMS2, will be utilized for the

"data base" in figure 1. It is expected that an index for the EPDF and

a sample of the two different MPF's, in their entirety, can be stored on

the one Adage pack and the portion of the other pack not used by the system

software. (The DMS2 has two packs.) The TBM is much too large to store on

the DMS2 in its entirety. Currently, it consists of 597,220 220 character

records on a total of eighteen magnetic tapes. Perhaps one of the reels

SECRET

of the TBM could be stored on the DMS2, but the entire TBM is out of

reach of all but the most voluminous large mass stores. The file

creation, i.e., the reading of the magnetic tapes and writing to the DMS2

can be accomplished in the following manner. Adage has a utility program

called MTARC which will read a specified length block from magnetic tape

into core memory beginning at a specified location. Once in core it

can be processed and written to the DMS2 creating the files in the

"data base" needed for the display requests. Processing, for example,

would include discarding the FCS tape labels and block descriptors. It

should be clear from this description that, as a result of the AGT's

programmable processor, no specially prepared magnetic tape will be

required.

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NPIC/TSSG/RED/SRB/CAS